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Diabetes Prevalence, Outcomes, and Preventive Services Among Maryland Medicare Beneficiaries, 2002

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ACKNOWLEDGMENTS AND DISCLAIMER

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C ONTENTS

F I G U R E S

DIABETES PREVALENCE, OUTCOMES, AND PREVENTIVE SERVICES AMONG MARYLAND MEDICARE BENEFICIARIES, 2002

D iabetes is the sixth leading cause of death in the United States (National Center for Health Statistics 2004). It is estimated that 13 million Americans have been diagnosed with diabetes and an additional 5 million have the disease but have not yet been diagnosed (U.S. Department of Health and Human Services 2004). From 1990 to 1998, diabetes prevalence increased 33 percent; increases were seen across all socio-demographic groups (Mokdad et al. 2000).

Diabetes complications are severe. They include cardiovascular disease, blindness, lower-extremity amputation, and kidney failure (Harris 1998). In 2002, expenditures attributable to diabetes totaled $132 billion (American Diabetes Association 2003a). Over $90 billion of this was spent on direct medical expenditures: $23 billion for diabetes care, $25 billion for treatment of chronic complications of the disease, and $44 billion for excess prevalence of general medical conditions among persons with diabetes.

Preventive care practices—such as dilated eye exams, foot exams, counseling on smoking cessation, and control of blood glucose, blood pressure, and lipids—can prevent or delay complications of diabetes (Allen et al. 1990; Diabetes Control and Complications Trial Research Group 1993; U.K. Diabetes Study Group 1998; Litzelman et al. 1993; and Ferris 1993). As a result, the Centers for Disease Control and Prevention and the National Institutes of Health have outlined several goals related to diabetes in the Healthy People 2010 objectives (U.S. Department of Health and Human Services 2000). These include: increasing to 50 percent the proportion of persons with diabetes who have a glycosylated hemoglobin measurement (HbA1c) at least once per year and increasing to 75 percent the proportion of persons with diabetes who have an annual dilated eye exam. The Healthy People objectives also identify targets for diabetes incidence, mortality, and lower-extremity amputations. Obtaining a pneumococcal and an annual influenza vaccine is also recommended for persons with diabetes because they are at increased risk of pneumonia and influenza complications compared to persons without diabetes (Geiss and Thompson 1995; and Centers for Disease Control and Prevention 2000).

The Healthy People goals are national, however, and since diabetes rates vary by state, they require area-specific monitoring and intervention. In 2001, 6.7 percent of the adult population residing in Maryland was diagnosed with diabetes (Maryland Department of Health and Mental Hygiene 2004). As in the nation as a whole, prevalence was higher among African Americans (9.7 percent) compared with whites (5.7 percent). In the same year, over 14 percent of state residents aged 65-74 had diabetes.

This report presents rates of diabetes prevalence and of diabetes quality measures—including selected preventive services and adverse outcome measures—among Maryland Medicare beneficiaries with diabetes, using 2002 Medicare administrative data. These rates will provide the Maryland Department of Health and Mental Hygiene (DHMH) and the newly-formed Maryland Diabetes Prevention and Control Coalition with baseline rates for surveillance purposes. Developing such a baseline will allow the state: (1) to assess the current diabetes prevalence among Medicare beneficiaries in Maryland; (2) to compare the disease prevalence among Maryland residents to Healthy People objectives; (3) to monitor diabetes trends in prevalence, preventive services and complications among Maryland Medicare beneficiaries over time and across demographic and geographic subgroups; (4) to compare state trends to national trends; and (5) to develop targeted interventions to increase the provision of services and reduce diabetes prevalence and complications among high-risk groups.

The following section presents a brief overview of the data and methods used in this study. The results section first presents results for each quality measure for the state as a whole, followed by discussion of how each quality measure varies by demographic characteristics and by county. The final section summarizes key findings and discusses the implications for the state of Maryland and other key stakeholders for diabetes prevention and control efforts. Appendix A presents detailed tables of results for each quality measure. Appendix B presents state maps highlighting counties with relatively high and low rates for each quality measure. Appendix C contains detailed descriptions of each quality measure and Appendix D describes the data processing in more detail.

METHODS

Data and Sample

This study uses Medicare administrative data from the 2002 100% Denominator, MedPAR (inpatient and skilled nursing facility), Outpatient Standard Analytic File (SAF), Home Health SAF, Hospice SAF, and the Medicare component of Medical Care Database (MCDB) for physician claims files for Maryland.

The main study cohort includes beneficiaries who resided in Maryland, were eligible for Medicare in January 2002, were enrolled in Medicare FFS Parts A and B for the full year or

until death, and were not enrolled in managed care at any point in the year.[1] This group contains 582,754 total beneficiaries and 96,549 identified as having diabetes. New enrollees who joined Medicare part way through the year are not included in the cohort.[2] A little less than 8 percent of beneficiaries with diabetes in this main study cohort died during the year. These beneficiaries were enrolled for an average of 8.3 months during the year.

To compare 2002 results to a previous project (the Medicare Quality Monitoring System, or MQMS, developed by the Centers for Medicare & Medicaid Services) that calculated time trends in rates of diabetes quality measures for Maryland, an alternative cohort of beneficiaries was also created. The alternative cohort has the same inclusion criteria as the main cohort, except that those who had a date of death in 2002 are excluded. That is, the cohort contains enrollees in FFS Parts A and B only who were present all 12 months of the year. This cohort contains 555,018 total beneficiaries and 89,241 with diabetes. Most of the results presented in this report focus on the main study cohort; however, the alternative cohort provides an example of a slightly healthier group of beneficiaries and one in which all members had 12 full months of claims history.

Identification of Beneficiaries with Diabetes

Using the claims files, beneficiaries with diabetes in the Maryland study sample were identified as those with at least one acute care claim or at least two nonacute face-to-face claims at least seven days apart with a diabetes diagnosis (250*, 3572*, 3620*, and 36641, where * stands for any code in the fourth or fifth position). (Refer to Appendix D for a list of acute and nonacute face-to-face claims codes and data sources.) Beneficiaries with evidence of gestational diabetes (indicated by diagnosis code of 6480* or 6488*, where * stands for any code in the fifth position) were excluded. The majority—about 75 percent— of the sample of FFS Parts A and B diabetic claimants were identified from nonacute records alone. About 20 percent were identified from both acute and nonacute records, and a little less than 5 percent were identified from acute claims only.

Since beneficiaries with diabetes in this study are identified by use of diabetes-related services in the claims data, it is possible that differences in health care service use may partially explain differences in diabetes prevalence rates. For example, if there are certain groups of persons with diabetes who tend not to use health care services related to their diabetes, they will be less likely to be captured as having diabetes in this study. However, claims-based algorithms for identifying persons with diabetes are well validated (Herbert et al. 1999; McBean 2004).

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[1] Maryland residence during 2002 was determined by place of residence in March 2003, since the 2002 Denominator file was created at that time.

[2] This restriction excluded 2,355 diabetic beneficiaries.

Diabetes Quality Measures

The analysis includes eleven diabetes quality indicators, in addition to diabetes prevalence. The six preventive service measures are (1) HbA1C tests,[3] (2) dilated eye examinations, (3) lipid profile (cholesterol) testing, (4) influenza vaccinations, (5) pneumococcal vaccinations, and (6) microalbuminuria testing. These preventive measures were selected because they are standards of care for people with diabetes (American Diabetes Association 2003b) and some are used as quality-of-care measures for diabetes monitoring efforts (Jencks et al. 2000; 2003). HbA1c tests monitor the degree of blood glucose over the last three months, and are recommended at regular intervals for people with diabetes. Dilated eye exams are recommended annually and provide early identification and treatment of complications related to retinal damage due to diabetes. A lipid profile test is also recommended annually for people with diabetes since they are at higher risk for cardiovascular disease. Persons with diabetes are recommended to have influenza vaccines (annually) and pneumococcal vaccines because they are at higher risk for complications from these illnesses. Finally, microalbuminuria tests are used to detect early kidney damage.

The five adverse outcomes measures include (1) lower-limb amputation, (2) hospital admission for uncontrolled diabetes, (3) hospital admission for short-term complications of diabetes, (4) hospital admission for long-term complications of diabetes, and (5) end-stage renal disease (ESRD). "Uncontrolled" diabetes refers to having blood glucose levels within an unacceptable range. Short-term complications include diabetic ketoacidosis, hyperosmolarity, and coma; long-term complications include renal, eye, neurological, and circulatory disorders. The Agency for Healthcare Research and Quality (AHRQ) has targeted the first four outcome measures as prevention quality indicators related to diabetes (Agency for Healthcare Research and Quality 2004). ESRD is advanced kidney failure requiring dialysis. It is a severe long-term complication of diabetes that indicates poor control of blood sugar over time, as well as inadequate monitoring of kidney function and early treatment of early kidney damage.

Except for ESRD, indicators for diabetes quality measures were identified using claims data for beneficiaries with diabetes (see Appendix B for detailed diabetes measures specifications). ESRD was defined using the ESRD indicator variable in the Denominator file.

Presentation of Results

Tables 2 through 4 in Appendix A present rates of diabetes prevalence, preventive service use, and adverse outcomes for the entire state, and by beneficiary demographic groups and county. For each measure, the results include the rate per 100 beneficiaries (for prevalence) or the rate per 100 beneficiaries with diabetes (for prevention and complications measures). The tables include both unadjusted rates and age-sex adjusted rates. (Table A.1

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[3] The study calculates two HbA1c measures: (1) one or more tests in the year, and (2) two or more tests in the year.

presents a statewide summary of each measure with comparisons to previous estimates; tables A.2a and A.2b present the unadjusted and adjusted rates of diabetes prevalence by demographic group and county; tables A.3a and A.3b present the unadjusted and adjusted rates of preventive services by demographic group and county; and tables A.4a and A.4b present the unadjusted and adjusted rates of outcome measures by demographic group and county.)

Rates by subgroup were adjusted using the direct standardization method and the 2002 statewide age and sex distribution of Medicare beneficiaries (males and females ages 0-64, 65-74, 75-84, and 85 and over) as the standard population. Each table in the appendix also presents two sets of rates for the two study cohorts. The top panel of each table contains the results for the main study cohort, and the bottom panel the results for the alternative cohort. Unless noted, the discussion and figures in the main body of the report focus on the age-sex adjusted rates for the main study cohort.

RESULTS

Comparison with Previous State and National Estimates and Trends

When compared to other state estimates for earlier time periods, the results for 2002 suggest that the prevalence of diabetes is increasing among the Medicare FFS Medicare population in Maryland. It is also apparent that the use of most preventive measures by beneficiaries with diabetes in the state is increasing. Previous data on rates of adverse outcomes are few, but the rates of lower-limb amputations appear to have fallen in the state. Table A.1 presents a summary of statewide rates of diabetes prevalence and quality measures in 2002, and comparisons with previous national and state estimates.

Prevalence Rates

In 2002, nearly 17 percent of FFS Medicare beneficiaries in Maryland had diabetes, as identified through Medicare claims data (Table A.1). (The alternative study cohort of beneficiaries enrolled all year had a slightly lower prevalence rate of 16 percent.) This estimate of prevalence is consistent with a 2002 estimate from the Behavioral Risk Factor Surveillance System in Maryland (16 percent) and represents an increase from a previous estimate of 14 percent in 1997 that used a similar methodology (Maryland Health Care Commission 2000). This is consistent with other estimates of increasing prevalence of diabetes nationwide (Mokdad et al. 2000).

The 2002 Maryland diabetes prevalence rate is slightly lower than a recent claims-based national estimate from 2001, which used two years of claims, as opposed to one year in the current study, to identify persons with diabetes (McBean et al. 2004). The rate is consistent with recent national estimates from self-reported survey results from the Medicare Current Beneficiary Survey (18 percent), the BRFSS (17 percent) and the National Health Interview Survey (15 percent) (Appendix A, Table A.1).

Rates of Adverse Outcomes

Figure 1 presents the rates of adverse outcomes among beneficiaries with diabetes in Maryland. In 2002, 3.1 percent of FFS beneficiaries with diabetes in Maryland had ESRD. By comparison, 1.2 percent of all Maryland Medicare FFS beneficiaries had ESRD in 2002. Lower-limb amputation occurred among 0.9 percent of beneficiaries with diabetes, a decrease from previous claims-based estimates (Table A.1). However, the Healthy People 2010 target for this outcome is much lower (0.18 percent) than the 2002 rate.

Figure 1. Percent of Beneficiaries with Diabetes with Adverse Outcomes, Maryland 2002
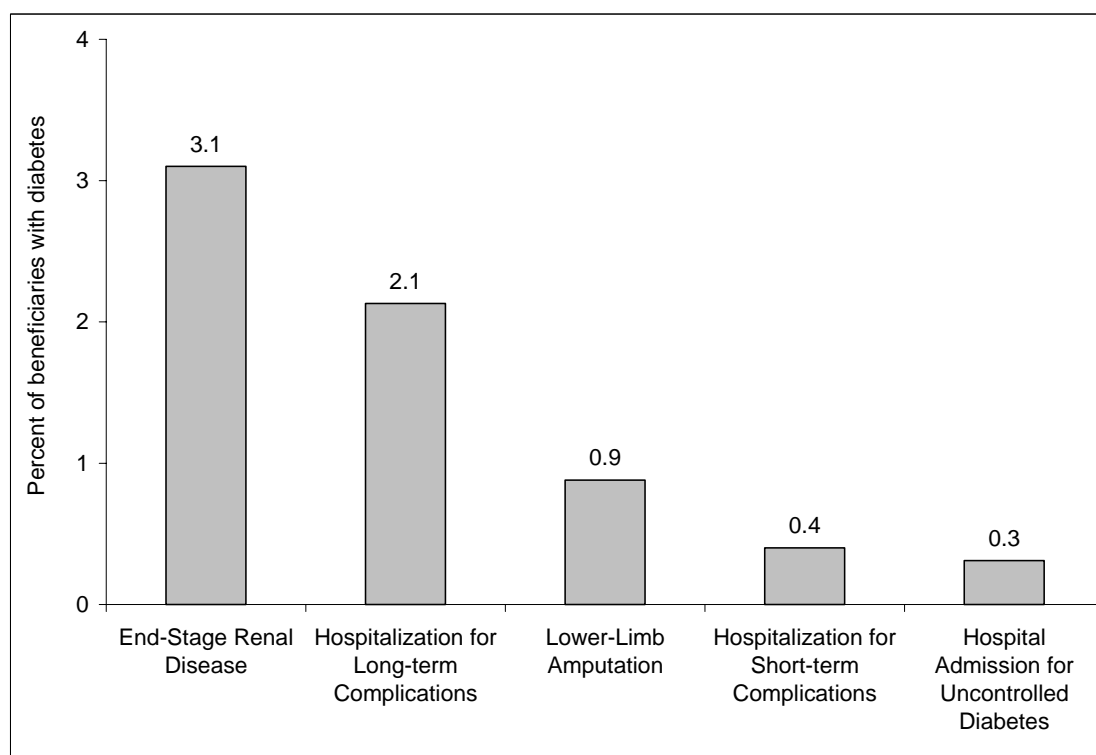
Note: Rate per 100 beneficiaries with diabetes.

Hospitalization for other long-term complications of diabetes—such as cardiovascular or renal complications—was the most frequent type of hospitalization among those studied, with 2.1 percent of beneficiaries experiencing this type of hospitalization. Hospitalization for short-term complications (such as ketoacidosis) and for uncontrolled diabetes (such as severe hyperglycemia) occurred in less than half a percent of beneficiaries with diabetes in 2002.

These three hospitalization measures are part of AHRQ's Prevention Quality Indicator measure set and are based on hospitalizations with primary diagnoses of diabetes (ICD-9-CM 250) with fourth- and fifth-digit codes indicating specific diabetic complications, rather than on hospitalizations with primary diagnoses for the specific complications (such as heart attack) and secondary diagnoses of diabetes.

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Rates of Preventive Measures

Figure 2 presents the percent of beneficiaries with diabetes in Maryland who received certain preventive services in 2002. The most frequent preventive service was the HbA1c test. In 2002, over 80 percent of beneficiaries with diabetes received at least one test, representing an increase from previous estimates in Maryland and nationwide (Table A.1). This rate surpasses the goal set by Healthy People 2010 of 50 percent. Also, 55 percent of Medicare beneficiaries with diabetes received two or more HbA1c tests during the year (not shown in figure). This rate is lower than self-reported estimates of two or more HbA1c tests from the BRFSS (Table A.1).

Figure 2. Percent of Beneficiaries with Diabetes using Preventive Services, 2002
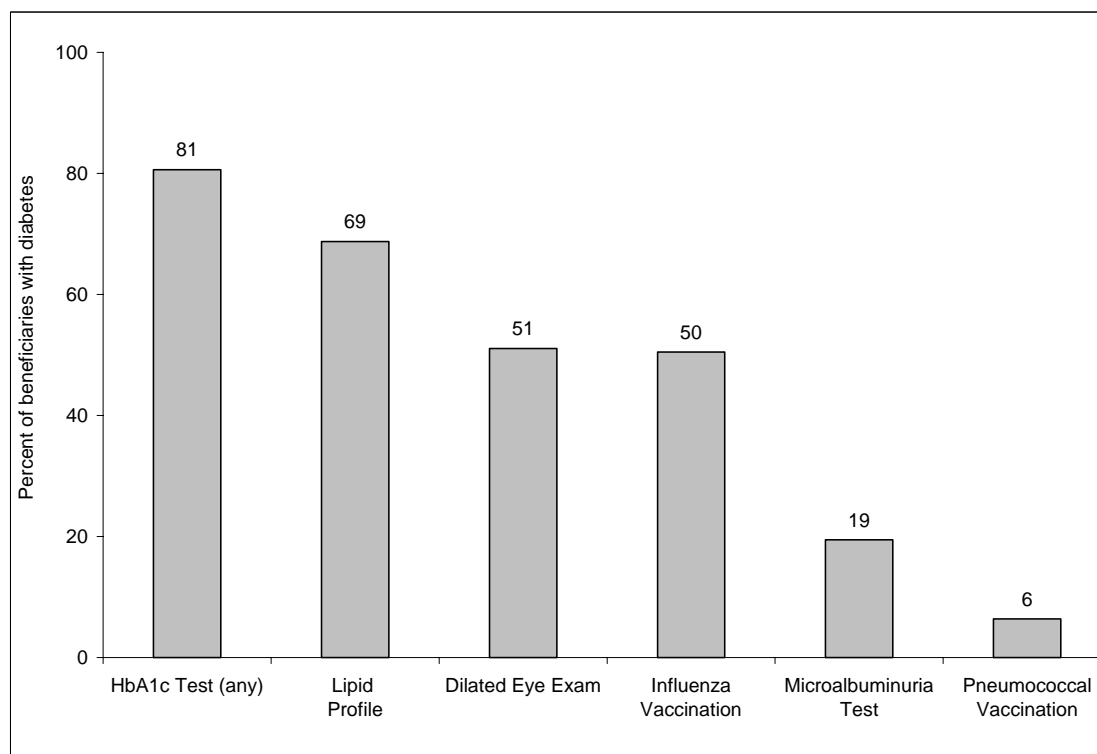
Note: Rate per 100 beneficiaries with diabetes.

A little less than 70 percent of beneficiaries with diabetes had a lipid profile test, while 51 percent had a dilated eye exam. The rate of dilated eye exams is lower than the Healthy People 2010 goal of 75 percent. Fewer than 20 percent of beneficiaries with diabetes received a microalbuminuria test during the year. (This test is not relevant for some persons with diabetes, such as those with advanced kidney damage, or ESRD.)

Just over half of beneficiaries with diabetes received an influenza vaccine and 6 percent received a pneumococcal vaccine in 2002. These rates could underestimate the true rate to the extent that beneficiaries received vaccinations through a clinic that did not bill

individually for the services. In addition, while the influenza vaccine is recommended annually, the pneumococcal vaccine is recommended once for persons aged 65 and older.[4]

Compared with previous estimates for selected prevention measures from the MQMS, use of most prevention measures—except dilated eye exams—increased in 2002 (Figure 3).[5] (Note that Figure 3 presents 2002 rates from the alternative study cohort enrolled in FFS parts A and B for all 12 months of the year, to be consistent with rates from MQMS.)

Figure 3. Trends in Preventive Service Use Among Beneficiaries with Diabetes in Maryland, 2002
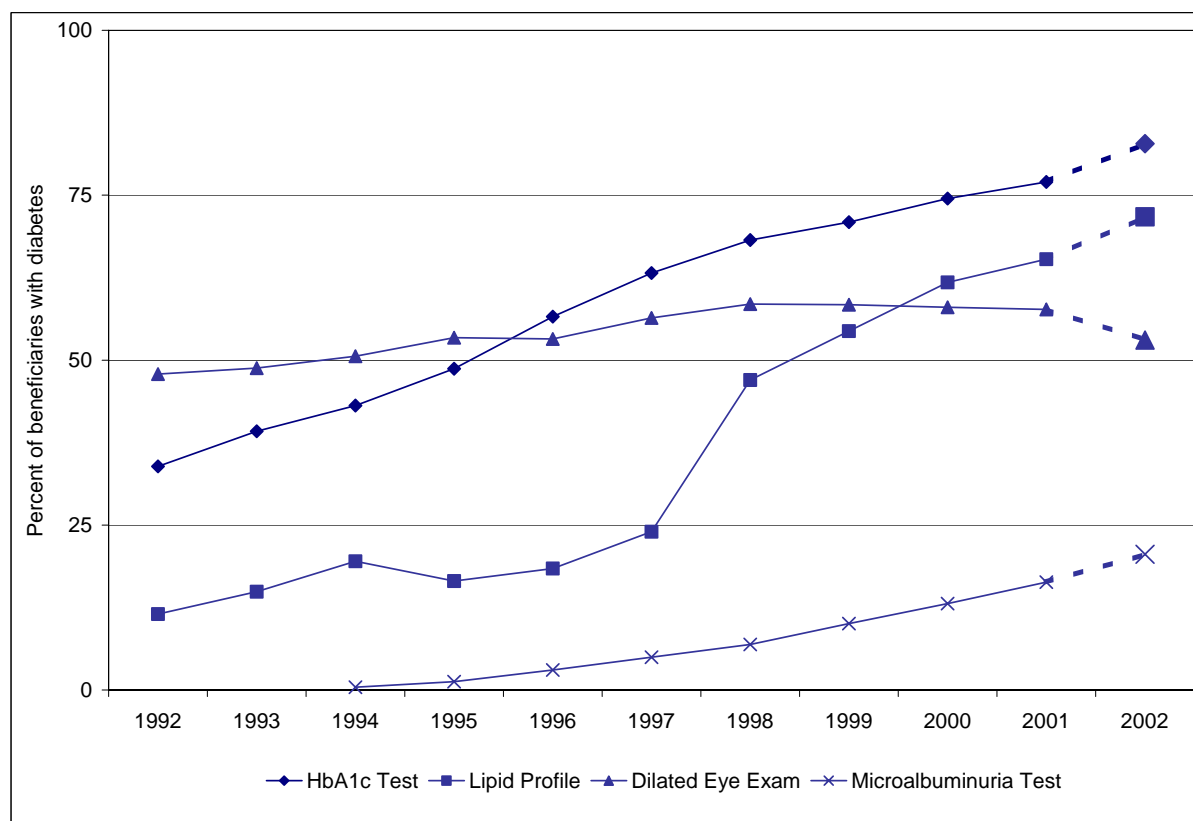
Notes: 2002 data (dotted line) present rate per 100 beneficiaries with diabetes. 1992-2001 data (solid line) are from the Medicare Quality Monitoring System (MQMS) data from the Centers for Medicare & Medicaid Services. MQMS uses data from a 5-percent national sample of beneficiaries, and rates are adjusted to the July 1999 national distribution of Medicare enrollees.

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[4] Persons aged 65 years or older who have already been vaccinated should be revaccinated if they received the vaccine five or more years ago, and were younger than 65 at the time of the primary vaccination.

[5] MQMS is a CMS surveillance initiative that calculates the rates of diabetes process and outcome measures for a sample of beneficiaries enrolled in Parts A and B FFS only for the full year (Kuo 2003).

Rates of HbA1c testing (at least one per year) and lipid profile tests increased rapidly over the period. Microalbuminuria testing has also increased steadily since 1994. However, rates of dilated eye exams increased slightly between 1992 and 1997, but then declined slightly from 1997 to 2002, although not all the way back to the 1992 rate.   Rates of dilated eye exams in the current study are lower than self-reported rates in the BRFSS; however, rates in the BRFSS also showed decreases in the last few years.[6] Reasons for this decline are at present unknown.

Variation by Demographic Characteristics

This section highlights differences in diabetes quality measures by demographic characteristics in order to help the state develop targeted interventions to increase the provision of services and reduce diabetes prevalence and complications among high-risk groups. The 2002 results suggest that certain groups of Maryland Medicare beneficiaries— African Americans, Medicaid enrollees, and beneficiaries qualifying for Medicare as nonelderly disabled—are disproportionately affected by diabetes. These groups tend to have higher prevalence rates (with the exception of the nonelderly disabled), lower use of preventive services, and more complications. These groups also overlap one another quite a bit.[7]
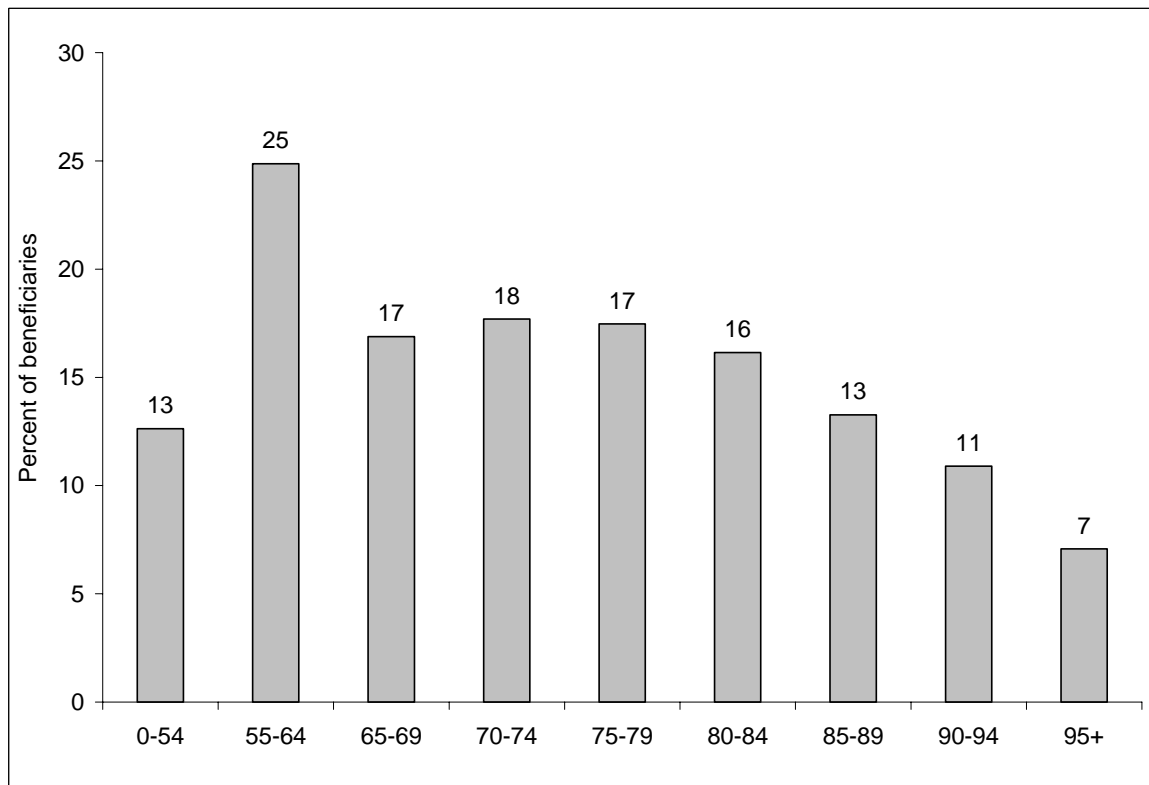
Prevalence Rates

Diabetes prevalence rates in Maryland varied by beneficiary characteristics such as age, race, and Medicaid enrollment, after adjustment for differences in the age-sex distribution across these groups (Table A.2b).[8] For example, as seen in Figure 4, prevalence rates were highest among beneficiaries aged 55 to 64 but declined by age starting with ages 70 to 74. Although the prevalence rate among beneficiaries aged 55 to 64—who qualify for Medicare due to disability—was relatively high (25 percent), this group accounted for only 7 percent of persons in the study cohort with diabetes (see table A.2a for the distribution of the diabetic cohort).

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[6] See www.cdc.gov/diabetes/statistics/index.htm.

[7] For example, African American Medicare beneficiaries were disproportionately enrolled in Medicaid (24 percent of African Americans and 8 percent of whites) and qualified as nonelderly disabled (22 percent versus 9 percent), results not shown. In addition, 42.6 percent of nonelderly disabled beneficiaries were dual enrollees in comparison to 14.1 percent of aged beneficiaries.

[8] Rates for age groups and Medicare status (aged, disabled, ESRD) are adjusted only for sex, and rates for sex groups are adjusted only for age.

Figure 4. Percent of Maryland Medicare Beneficiaries with Diabetes, by Age Group, 2002
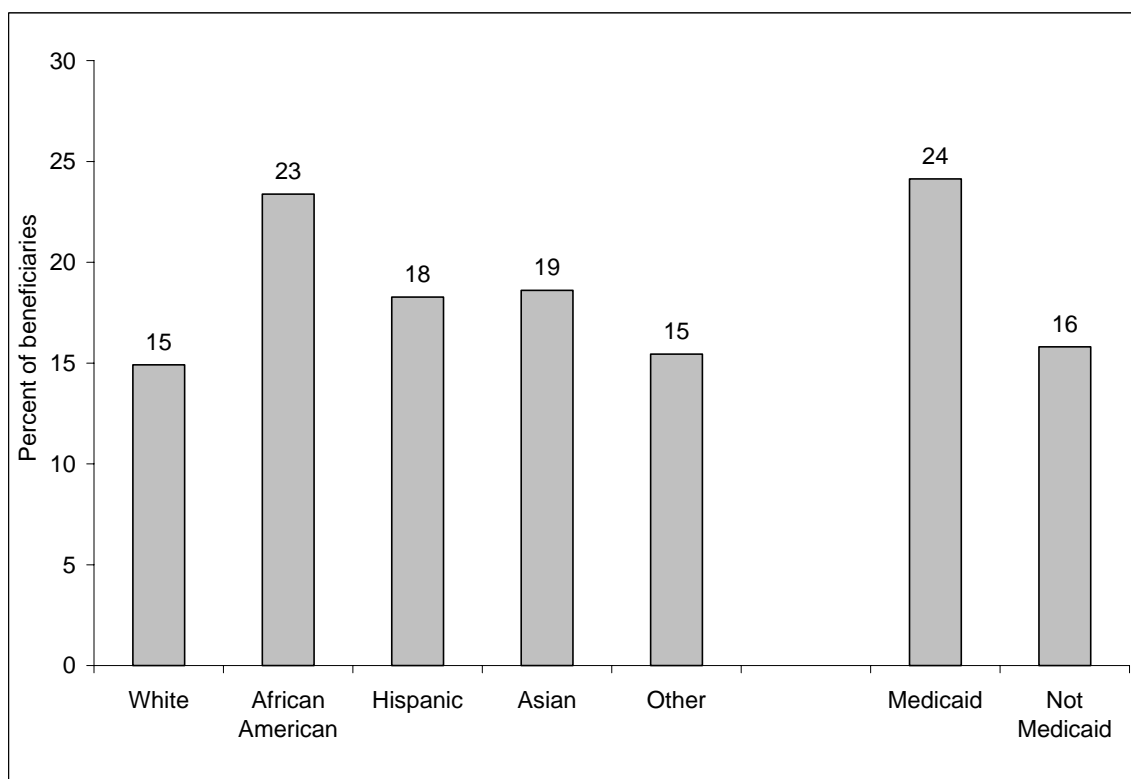

Note: Sex-adjusted rates per 100 beneficiaries.

Diabetes prevalence rates varied noticeably by race and enrollment in Medicaid (Figure 5). African Americans had the highest rates of diabetes among Maryland Medicare beneficiaries, with a prevalence rate of 23 percent, compared with 15 percent among white beneficiaries. Hispanics and Asian beneficiaries were also more likely to have diabetes compared with whites, with prevalence rates of 18 and 19 percent, respectively. However, despite their lower prevalence rates, whites still accounted for 70 percent of diabetic beneficiaries in the state (see Table A.2a). Beneficiaries dually enrolled in Medicaid and Medicare had higher rates (24 percent versus 16 percent) than beneficiaries not enrolled in Medicaid.[9] Dual enrollees accounted for 18 percent of diabetic beneficiaries (Table A.2a).

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[9] The data used for this study do not record true dual enrollment status but indicates at a minimum the state Medicaid program pays for the beneficiary's Medicare premiums, co-pays, and deductibles. The payment of these Medicare expenses by Medicaid does not always translate into full Medicaid coverage, but is a reasonably accurate indicator of beneficiary poverty.

Figure 5. Percent of Maryland Medicare Beneficiaries with Diabetes, by Race and Medicaid[9] Enrollment, 2002

Note: Age-sex adjusted rates per 100 beneficiaries.

Diabetes rates were similar for males and females, but black females had much higher rates than did white females (25 percent and 14 percent, respectively) (see Table A.2b). Diabetes prevalence was also similar for beneficiaries who qualified for Medicare as nonelderly disabled and those who qualified as aged (see Table A.2b). However, within the aged and disabled groups, persons eligible under the Medicare ESRD benefit had much higher rates of diabetes than persons without ESRD (not shown).

Rates of Adverse Outcomes

Although adverse outcomes occurred among relatively few beneficiaries with diabetes in Maryland, there were notable disparities by race, Medicaid status, and reason for Medicare eligibility. For example, African Americans had higher rates than white beneficiaries for all adverse outcome measures in 2002 (Figure 6).

Figure 6. Adverse Outcomes Among Beneficiaries with Diabetes, by Race, 2002
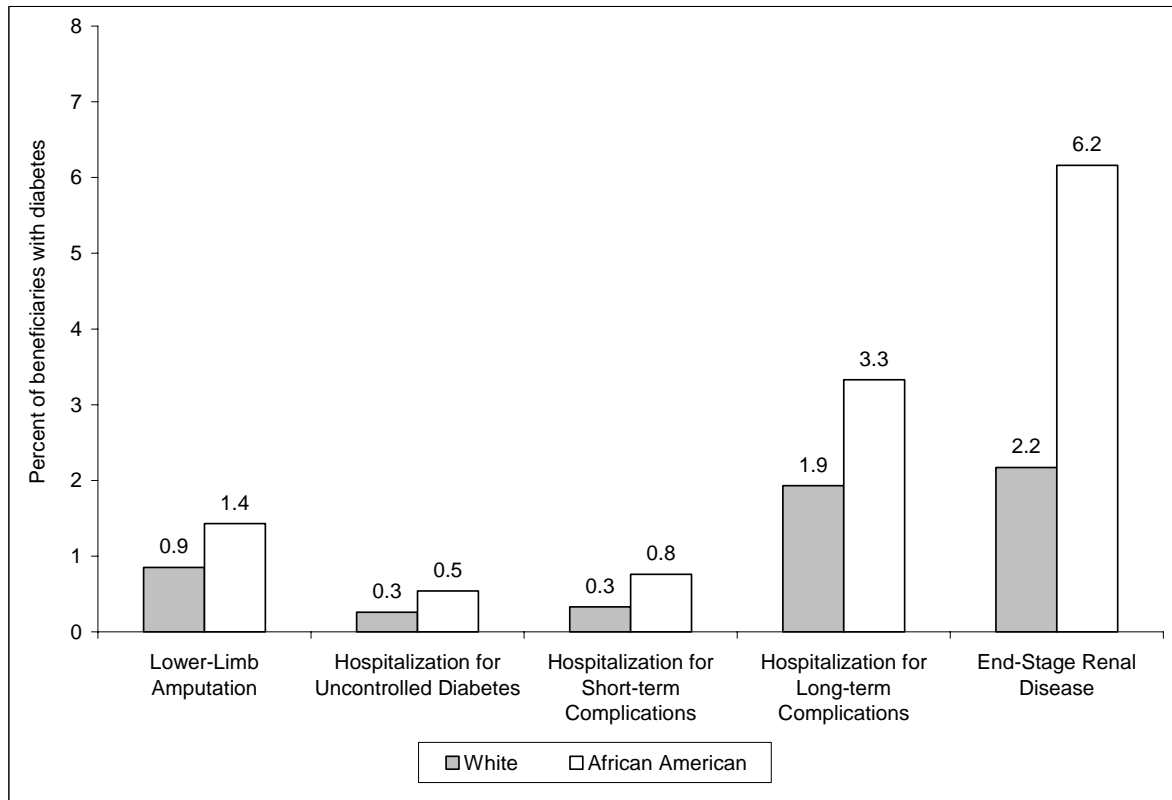
Note: Age-sex adjusted rates per 100 beneficiaries with diabetes.

African Americans had rates of hospitalizations for uncontrolled diabetes and for short-term diabetes complications that were more than twice those among whites (see Table A.4b). The percent of African American diabetic beneficiaries with ESRD was nearly three times that among white diabetic beneficiaries.

A very similar pattern occurred among beneficiaries enrolled in Medicaid, who experienced higher rates of all adverse outcomes than did non-Medicaid enrollees (see Table A.4b). For example, 3.5 percent of Medicaid enrollees with diabetes had a hospitalization for a long-term complication of diabetes, compared with 2.0 percent among non-Medicaid enrollees with diabetes.

Although rates of prevalence and preventive service use among males and females were similar across most measures, rates of lower-limb amputations, hospitalization for long-term complications of diabetes, and ESRD were noticeably higher among males than among females with diabetes (Figure 7 and Table A.4b). The difference appears to be driven by high rates among nonwhite males (1.8 percent for amputations and 3.7 percent for hospitalization for long-term complications). Females did have slightly higher rates of hospitalizations for short-term complications of diabetes compared with males (0.5 percent versus 0.4 percent).

Figure 7. Adverse Outcomes Among Beneficiaries with Diabetes, by Gender, 2002
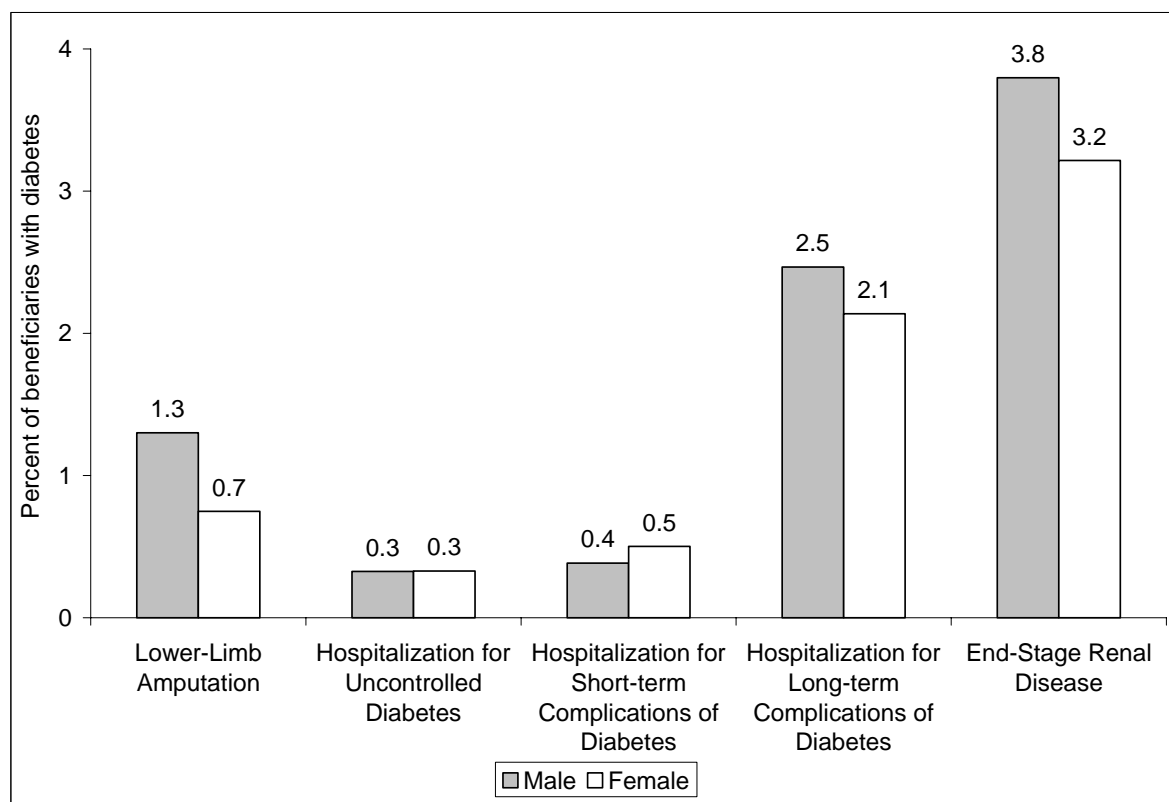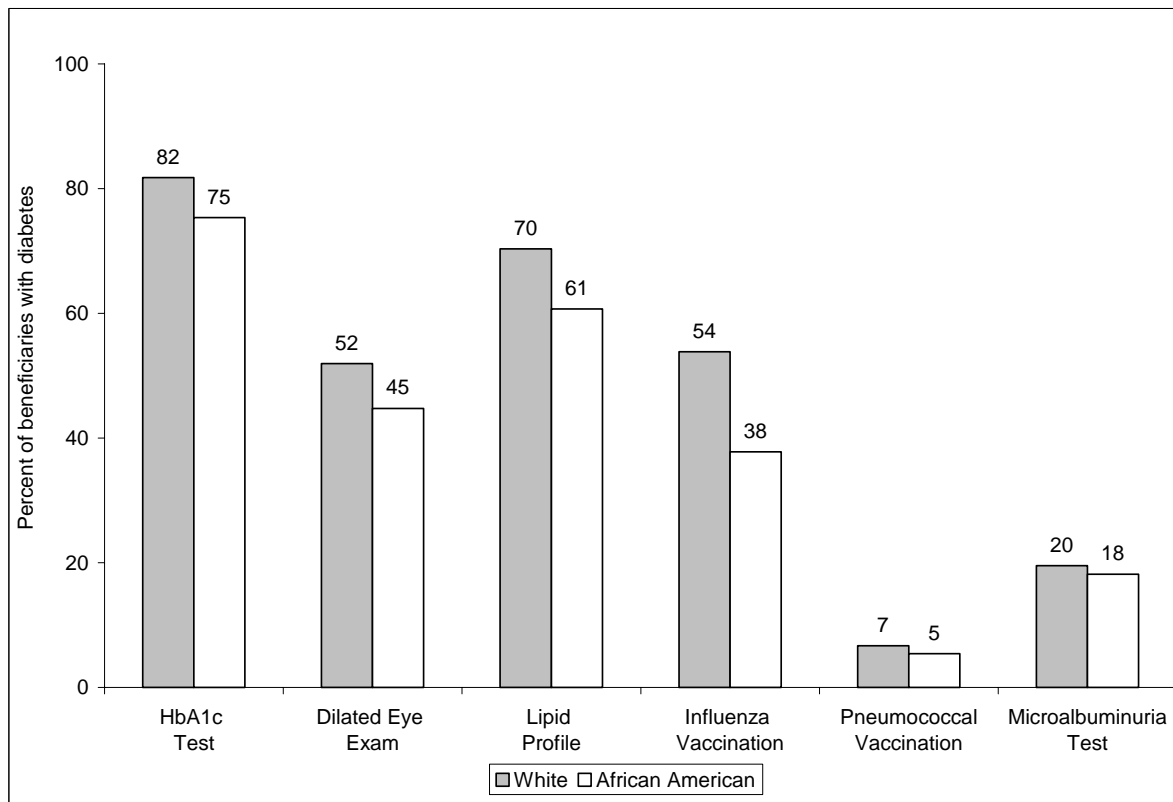

Note: Age-adjusted rates per 100 beneficiaries with diabetes.

Finally, the nonelderly disabled had much higher rates of all adverse outcomes than those qualifying as aged (see Table A.4b). For example, 0.6 percent of aged beneficiaries had lower-limb amputations in 2002 compared to 1.7 percent of nonelderly disabled beneficiaries. And 1.6 percent of aged beneficiaries had ESRD versus 9.4 percent of disabled beneficiaries.

Rates of Preventive Measures

As with prevalence and outcome rates, use of preventive measures by beneficiaries with diabetes varied widely across demographic groups, with the same groups who had higher prevalence and adverse outcomes of diabetes using fewer preventive services (Table A.3b). These patterns may reflect differences across these groups in access to physicians, quality of care, health education, and in health-seeking behavior.

African Americans with diabetes had lower rates of use for all preventive services than white beneficiaries with diabetes (Figure 8). The rate of HbA1c testing was 6 percentage points lower among African Americans than among whites, while the rate of lipid profile tests was 10 percentage points lower, and the rate of influenza vaccinations was 16 percentage points lower.

Figure 8. Preventive Service Use Among Beneficiaries with Diabetes, by Race, 2002

Note: Age-sex adjusted rates per 100 beneficiaries with diabetes.

Hispanic beneficiaries with diabetes also had lower rates of lipid profile tests (47 percent) and influenza vaccines (45 percent) than did white beneficiaries (see Table A.3b). Rates of pneumococcal vaccination were also lower among African Americans and Hispanics (4 and 5 percent, respectively) than whites (7 percent). However, rates of microalbuminuria tests were similar across racial groups.

Rates of preventive service use were also noticeably lower for all services among beneficiaries dually enrolled in Medicaid and Medicare compared to those not in Medicaid (Figure 9). For example, dilated eye exams, lipid profiles, and influenza vaccines were 15 percentage points lower among dual enrollees.

Figure 9. Preventive Service Use Among Beneficiaries with Diabetes, by Medicaid Enrollment, 2002
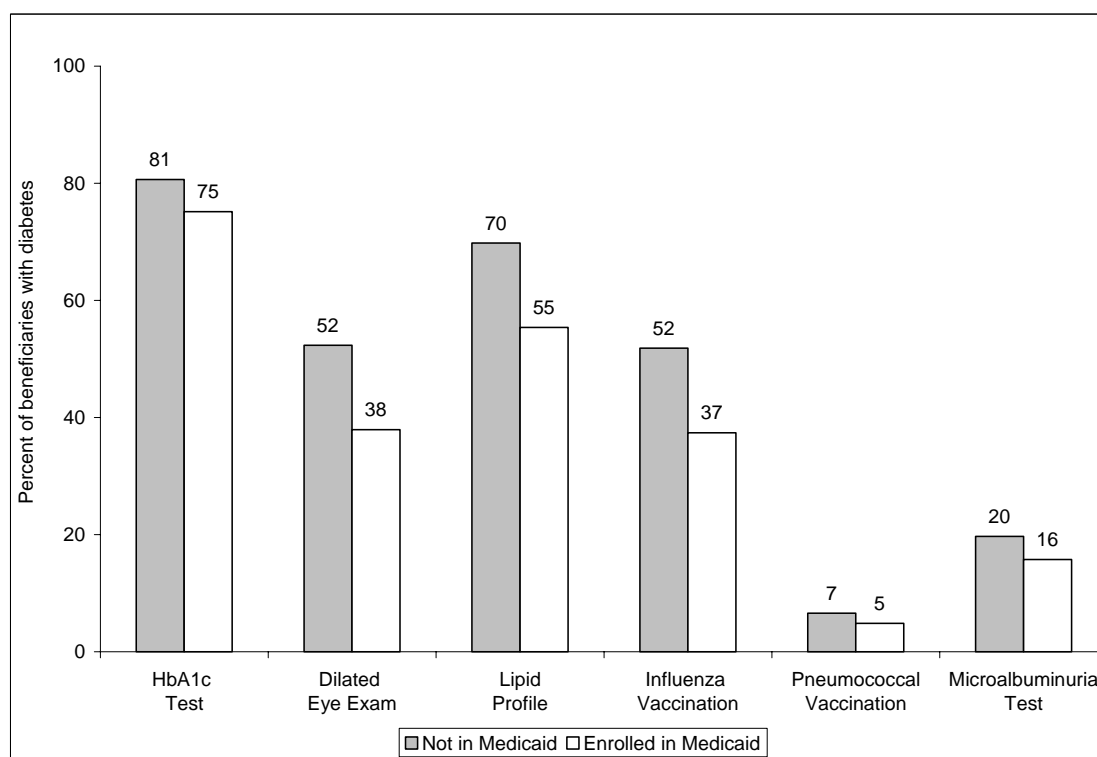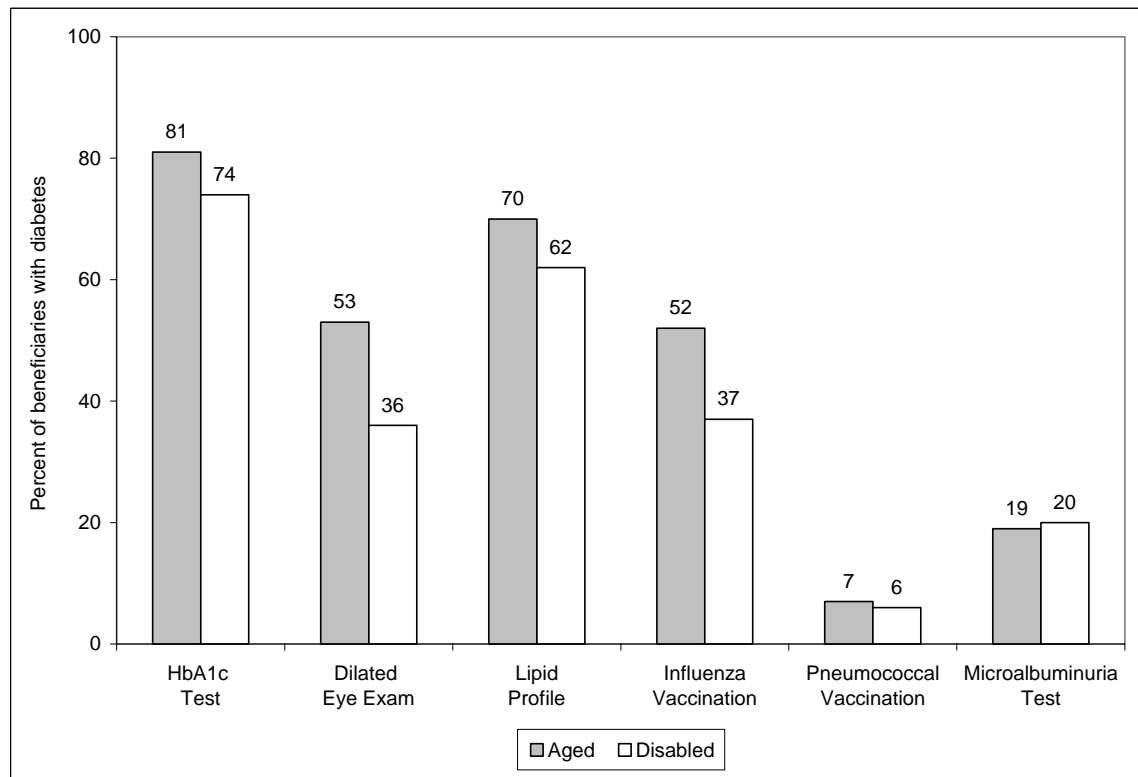

Note: Age-sex adjusted rates per 100 beneficiaries with diabetes.

Finally, nonelderly disabled beneficiaries were less likely than aged beneficiaries to use all preventive services except microalbuminuria tests (Figure 10).[10] For example, while 53 percent of aged diabetic beneficiaries had a dilated eye exam during the year, 36 percent for disabled beneficiaries had an exam. Influenza vaccinations were also much lower among disabled beneficiaries.

A separate analysis (results not shown) also found that within the aged and nonelderly disabled groups, diabetic beneficiaries who were eligible for the Medicare ESRD benefit had much lower rates of preventive services than those without ESRD. Although beneficiaries with ESRD are a small proportion of beneficiaries with diabetes in the state, they do represent an easily identifiable group of beneficiaries who are receiving regular medical treatment. The low rate of preventive service use may reflect specific treatment decisions for a very sick population, but it seems there is opportunity to increase preventive service use among this group.[11]

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[10] Note that the rates by Medicare status group are adjusted only for differences in sex, since by definition the aged and disabled groups represent different age distributions.

[11] While a higher proportion of diabetic beneficiaries qualifying through ESRD died during the year, they were enrolled for only slightly less time, on average, than all diabetic beneficiaries; therefore, fewer months of enrollment during the year do not appear to explain the lower rates of preventive service use among this group.

Figure 10. Preventive Service Use Among Beneficiaries with Diabetes, by Medicare Status, 2002

Note: Sex-adjusted rates per 100 beneficiaries with diabetes.

Variation by County

To help Maryland assess whether there are certain counties or geographic areas where additional diabetes prevention and control efforts would be useful, this section summarizes the distribution of rates of diabetes prevalence and quality measures across the 24 political jurisdictions (23 counties and Baltimore City) in the state. Appendix B presents maps highlighting counties with age-sex adjusted rates that fall into "high", "medium" and "low" ranges (roughly broken into thirds) for each quality measure. (The county-specific age-sex adjusted rates are also presented in tables A.2b, A.3b, and A.4b.) While there were noticeable regional patterns in diabetes prevalence across the state, the patterns for outcomes and preventive services were less clear.

Prevalence Rates

The proportion of FFS Medicare beneficiaries with diabetes ranged from 13 percent to 21 percent (see Table A.2b). There was something of a regional pattern of diabetes prevalence in the state (Figure B.1). Diabetes was most prevalent in the western counties of the state (Garrett and Allegany) and in some lower eastern shore counties (Caroline, Dorchester, Wicomico, and Somerset, and St. Mary's). For example, Allegany, Dorchester, and Somerset counties had prevalence rates of 21 percent.

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The counties with the lowest diabetes prevalence rates—Montgomery, Howard, Carroll, Baltimore, Anne Arundel, Harford, and Talbot—were mostly concentrated in central counties of the state. For example, 13 percent of beneficiaries in Montgomery County and 14 percent in Howard County had diabetes.

While the rates presented in Figure B.1 are adjusted for differences across counties in the age and sex distribution, variation in rates may also be due to differences in the racial and income distribution, and to differences in access to care, physician supply, and health-seeking behaviors. For example, prevalence rates appear to be highly inversely correlated with patterns of per capita income across the state (Appendix A, Table A.5).

Rates of Adverse Outcomes

The percent of beneficiaries with diabetes with adverse outcomes varied widely across counties (Table B.4b). For example, rates of lower-limb amputation ranged from 0.6 percent of beneficiaries with diabetes in Montgomery County to 1.8 percent in Kent County. The proportion of diabetic beneficiaries with ESRD ranged from 1.5 percent in Garrett County to 5.0 percent in Prince George's. In addition, the rate of hospitalization for long-term complications of diabetes ranged from 1.3 percent in Washington County to 3.8 percent in Dorchester.

Unlike diabetes prevalence, there was less obvious regional variation across counties in outcomes measures. Figures B.2 through B.6 present state maps for each outcome measure. Baltimore City was the only jurisdiction that was consistently in the group of counties with the highest rates of adverse outcomes across all the measures. Prince George's County had relatively high rates of all adverse outcomes except lower-limb amputation. Howard and Garrett counties had relatively low rates of adverse outcomes for four of the five outcomes measures. While Howard County had the second highest per capita income in the state, Garrett County had one of the lower levels of per capita income in the state. County differences in adverse outcomes are likely driven by a number of related factors such as the demographic makeup of the county, access to care, and physician practice patterns.

Rates of Preventive Measures

The rate of preventive service use also varied by county (Table B.3b). For example, the proportion of beneficiaries with diabetes receiving an HbA1c test in 2002 ranged from 74 percent in Prince George's County to 88 percent in Garrett, while the proportion of beneficiaries with diabetes who received a dilated eye exam ranged from 30 percent in Caroline County to 61 percent in Worcester. Lipid profile rates also varied from 59 percent in Calvert County to 74 percent in Montgomery County.

The state maps in figures B.7 through B.13 suggest some regional patterns in preventive service use for certain measures, although no counties consistently fell in the highest or lowest group for all preventive measures. Central Maryland counties—Montgomery, Carroll, Frederick, and Howard counties—had relatively high rates of most preventive services.

However, other central Maryland counties—Baltimore City and Prince George's—had relatively low rates of a number of preventive services.

Rates of HbA1c tests (Figure B.7) were relatively low in some central counties (Baltimore City, Prince George's and Charles) and eastern shore counties (Cecil, Talbot, Dorchester, and Worcester). Rates of dilated eye exams were also relatively low in a number of these counties (Figure B.9). There were no clear patterns across counties for lipid profiles or influenza vaccinations (figures B.10 and B.11). Pneumonia vaccinations were lowest in the eastern shore counties (Figure B.12).

SUMMARY AND IMPLICATIONS

Diabetes is a growing problem for Medicare beneficiaries in Maryland. Its prevalence among Medicare beneficiaries increased from 14 percent in 1997 to 17 percent in 2002, a trend consistent with national estimates. Whether this is due to an absolute increase in prevalence or increased screening to identify new cases of diabetes is unclear, but the importance of efforts to prevent diabetes through interventions to lower rates of obesity and increase levels of physical activity is clear.

The use of preventive services by beneficiaries with diabetes in Maryland appears to be increasing compared with previous state estimates. Rates of HbA1c testing have increased rapidly and exceed the Healthy People 2010 national goal. However, rates of dilated eye exams are below national targets and appear to be decreasing. This pattern deserves more attention. Although the rates of adverse outcomes such as lower-limb amputation appear to be decreasing, the percent of beneficiaries with diabetes with this outcome remained above the national target for 2010.

Diabetes affects certain groups of beneficiaries disproportionately, such as African Americans, nonelderly disabled beneficiaries, and those dually enrolled in Medicaid and Medicare. These groups use fewer preventive services, suffer more adverse outcomes than other beneficiaries, and with the exception of the nonelderly disabled, have higher rates of diabetes. These patterns deserve attention by state policy makers, managed care organizations and other health care providers.

There were notable regional patterns in diabetes prevalence. These regional variations may help state policymakers focus efforts on obesity prevention and in allocating health care resources. Although no one county was identified as performing consistently well or badly across all the diabetes quality measures, there were also regional patterns in rates of some preventive services and adverse outcomes. These patterns should help to focus efforts on certain areas where there may be issues regarding access to care, quality of care, supply of physicians, beneficiary diabetes education, or health-seeking behaviors.

The data in this report provide key baseline information to DHMH, the Maryland Diabetes Prevention and Control Coalition and other key stakeholders and policy makers. The Coalition, DHMH and their partners will use this information to plan, implement, and evaluate activities to increase rates of provision of preventive services among Medicare beneficiaries with diabetes. In addition, they will update these data periodically to document progress toward quality improvement goals for care of Medicare beneficiaries with diabetes in Maryland.

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